UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/560,567	12/12/2005	Peng Yin	PU030164	6673

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EXAMINER
THOMPSON, JAMES A

ART UNIT	PAPER NUMBER
2625	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/560,567	YIN ET AL.
	Examiner	**Art Unit**	
	James A. Thompson	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 December 2005*.
2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-37* is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-37* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on *12 December 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☐ All   b)☐ Some * c)☐ None of:
      1.☐ Certified copies of the priority documents have been received.
      2.☐ Certified copies of the priority documents have been received in Application No. _____.
      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date *12/12/05*.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____ .

DETAILED ACTION

Information Disclosure Statement

1.   The Information Disclosure Statement (PTO-1449) of 12 December 2005 has been fully

considered by Examiner. A signed, initialed and dated copy is included with the present action.

Note On Claim Interpretation

2.   Examiner notes that independent claims 1, 13 and 25 contain the language:

Claim 1, line 2: "the method comprising at least one of"

Claim 13, lines 2-3: "the encoder comprising at least one of"

Claim 25, line 2: "the signal data resulting from at least one of"

Thus, Applicant does not require that all elements listed be a part of the corresponding

method/system, but only requires that "at least one of" the elements be present. This

interpretation is further borne out by the fact that, for example, claim 4 repeats one of the recited

steps of claim 1. Thus, claim 4 only further limits claim 1 in that it *requires* the recited step

rather than making the step optional. Examiner will therefore interpret the claims accordingly.

Claim Rejections - 35 USC § 101

2.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or
> any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and
> requirements of this title.

3.   **Claims 1-37 are rejected under 35 U.S.C. 101 because the claimed invention is**

directed to non-statutory subject matter.

Independent claim 1 recites a video encoding method. However, the steps performed are all internal algorithmic computations. There is no form of output or input. There is no concrete, tangible and useful result. Further, the method is not tied to any particular machine, nor does the method transform any underlying subject matter. The recited method is merely a computational algorithm. Mere algorithms are within any of the statutory classes of invention, and are thus not patentable. Thus, claim 1 is non-statutory.

Claims 2-12 depend from claim 1. Further, none of claims 2-12 further limit claim 1 so as to place the corresponding dependent claim into a statutory class of invention. Thus, claims 2-12 are also each rejected as being non-statutory subject matter.

Independent claim 13 recites a video encoder. The video encoder can be embodied as software *per se*, or even as manual operations performed by a human being. On page 6, lines 24-34 of Applicant's specification, Applicant describes that manual human operations are within the scope of the encoder, as well as software stored in transient media, such as RAM, and the operation of program logic. Thus, claim 13 encompasses not only statutory subject matter, such as hardware or a computer-executable program stored on a computer-readable medium, but also non-statutory subject matter.

Claims 14-24 depend from claim 13. Further, none of claims 14-24 further limit claim 13 so as to place the corresponding dependent claim into a statutory class of invention. Thus, claims 14-24 are also each rejected as being non-statutory subject matter.

Independent claim 25 recites a digital videodisc encoded with signal data. However the signal data was produced, whether through a statutory or a non-statutory process, mere data on a disc does not fall within a statutory class of invention.

Claims 26-36 depend from claim 25. Further, none of claims 26-36 further limit claim 25

so as to place the corresponding dependent claim into a statutory class of invention. Thus,

claims 26-36 are also each rejected as being non-statutory subject matter.

Independent claim 37 recites a video encoding method. However, the steps performed

are all internal algorithmic computations. There is no form of output or input. There is no

concrete, tangible and useful result. Further, the method is not tied to any particular machine,

nor does the method transform any underlying subject matter. The recited method is merely a

computational algorithm. Mere algorithms are within any of the statutory classes of invention,

and are thus not patentable. Thus, claim 37 is non-statutory.

Claim Rejections - 35 USC § 112

4.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making
> and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it
> pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode
> contemplated by the inventor of carrying out his invention.

5.   **Claims 1-36 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply**

with the enablement requirement. The claim(s) contains subject matter which was not

described in the specification in such a way as to enable one skilled in the art to which it pertains,

or with which it is most nearly connected, to make and/or use the invention.

Claim 1 recites "a video encoding method for selecting the mode of a current macroblock

of an inter-coded frame, the method comprising *at least one of:*" a series of steps [emphasis

added]. While all the recited steps are required to obtain the desired encoding, merely

performing a single step is insufficient. Further, Applicant's disclosure does not demonstrate to

one of ordinary skill in the art how to perform video encoding for selecting the mode of a current

macroblock of an inter-coded frame by performing only one of the recited steps. Thus, claim 1

is not enabled by Applicant's disclosure.

Claims 2-12 depend from claim 1, and are therefore also rejected on the same grounds.

Claim 13 recites "a video encoder for encoding video signal data and selecting the mode

of a current macroblock of an inter-coded frame, the encoder comprising *at least one of:*" a

series of components [emphasis added]. While all the recited components are required to

construct the desired video encoder, Applicant's disclosure does not demonstrate to one of

ordinary skill in the art how to construct a video encoder for encoding video signal data and

selecting the mode of a current macroblock of an inter-coded frame from only one of the recited

set of components. Thus, claim 13 is not enabled by Applicant's disclosure.

Claims 14-24 depend from claim 13, and are therefore also rejected on the same grounds.

Claim 25 recites "a digital videodisc encoded with signal data comprising a plurality of

block transform coefficients, the signal data resulting from *at least one of:*" a series of steps

[emphasis added]. While all the recited steps are required to obtain the desired signal data,

merely performing a single step is insufficient. Further, Applicant's disclosure does not

demonstrate to one of ordinary skill in the art how to obtain the signal data comprising a plurality

of block transform coefficients by performing only one of the recited steps. Thus, claim 25 is

not enabled by Applicant's disclosure.

Claims 26-36 depend from claim 25, and are therefore also rejected on the same grounds.

6.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7.   Claims 25-36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 25 is directed to "a digital videodisc encoded with signal data comprising a plurality of block transform coefficients" but then recites that the signal data results from at least one of a series of recited method steps. Thus, it is not clear what is meant to be claimed by the recited language. Is claim 25 intended to be a method? If so, then method language should be used. Is claim 25 intended to be signal data? If so, then elements of the data should be recited, although, as discussed above, a mere collection of data is non-statutory. Since it is not clear what is meant to be covered by the recited language of claim 25, Applicant has failed to particularly out and distinctly claim the subject matter which Applicant regards as the invention.

Claims 26-36 depend from claim 25, and are therefore rejected on the same grounds.

Claim Rejections - 35 USC § 102

8.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

9.   Claims 1-4, 7-10, 12-16, 19-22, 24-28, 31-34, 36 and 37 are rejected under 35 U.S.C. 102(a) as being anticipated by Wang (US-2003/0099292).

Regarding claims 1, 13 and 25: Wang discloses a video encoding method for selecting the mode of a current macroblock of an inter-coded frame (para. 9, lines 1-4 and para. 11 of Wang), the method comprising at least one of: checking first modes for a subset of macroblock modes (para. 57 of Wang – *macroblocks each separately encoded in field or frame mode depending upon macroblock characteristics*), selectively checking other modes in response to motion vector information of the checked first modes, and selecting the mode for the current macroblock in response to the checked modes (para. 76 of Wang – *motion vector of the current block are determined and the mode selected based on the mode of the current block, the mode of the neighboring block, and either the field-based or frame-based motion vector of the neighboring block*); checking the macroblock mode of at least one neighboring macroblock, and selecting the mode for the current macroblock in response to the macroblock mode of the at least one checked neighboring macroblock (para. 78-81 of Wang – *field-based and frame-based motion vectors are determined and the mode selected for the current block based on the mode of the current block, the mode of the neighboring block, and either the field-based or frame-based motion vector of the neighboring block*); checking the cost of a subset of macroblock modes, further checking only intra-coded modes if the checked cost meets a preset criteria, and selecting the mode for the current macroblock in response to the checked modes; and adjusting an early-stopping threshold in response to checked macroblock modes, and selecting the mode for the current macroblock in response to the checked macroblock modes if the adjusted early-stopping threshold is met (*at least one of the steps is taught by Wang, thus claim 1 as recited is anticipated by Wang*).

Further regarding claim 13: The method of claim 1 is implemented by a video encoder (para. 39, lines 14-18 of Wang).

Further regarding claim 25: The method of claim 1 is used to produce a digital videodisc encoded with signal data comprising a plurality of block transform coefficients (para. 2 of Wang).

Regarding claims 2, 14 and 26: Wang discloses checking first modes for a subset of macroblock modes, selectively checking other modes in response to motion vector information of the checked first modes, and selecting the mode for the current macroblock in response to the checked modes (para. 94-95 of Wang – *macroblock mode determined based on different directional motion vectors for the different possible modes*).

Regarding claims 3, 15 and 27: Wang discloses that said first modes comprise the quadratic modes of SKIP (para. 97 of Wang), 16x16, 8x8, and 4x4 (figs. 3a-3f and para. 57-58 of Wang).

Regarding claims 4, 16 and 28: Wang discloses checking the macroblock mode of at least one neighboring macroblock, and selecting the mode for the current macroblock in response to the macroblock mode of the at least one checked neighboring macroblock (para. 78-81 of Wang – *field-based and frame-based motion vectors are determined and the mode selected for the current block based on the mode of the current block, the mode of the neighboring block, and either the field-based or frame-based motion vector of the neighboring block*).

Regarding claims 7, 19 and 31: Wang discloses initially performing motion estimation only for a subset of the possible block sizes; and using the motion information to determine if other motion estimation or complexity measures should be performed for other block sizes (para.

58 and para. 60, line 1 to para. 61, line 10 of Wang – *Motion information is used for a single macroblock to determine if frame or field encoding is to be performed. The other possible blocks sizes are then decided upon based on the determination of frame or field mode.*).

Regarding claims 8, 20 and 32: Wang discloses that said first modes are checked first and their motion information is used to decide if other modes needs to be checked (para. 58 and para. 60 of Wang – *other modes to be checked is determined based on the result of checking for frame or field mode*).

Regarding claims 9, 21 and 33: Wang discloses that spatial/temporal neighboring macroblock and block partition information is used to decide the subset of possible block sizes or inter/intra modes that need to be checked (para. 60, line 1 to para. 61, line 10 and para. 65, lines 1-5 of Wang).

Regarding claims 10, 22 and 34: Wang discloses initially performing mode checking for a subset of both inter modes and intra modes; calculating a complexity measure responsive to the mode checking; and using the complexity measure to determine if other inter modes and intra modes should be performed (para. 58 and para. 60, line 1 to para. 61, line 10 of Wang – *Motion information is used for a single macroblock to determine if frame or field encoding is to be performed [and thus either intra mode or intra mode]. The other possible blocks sizes [and thus possible macroblock modes] are then decided upon based on the determination of frame or field mode.*).

Regarding claims 12, 24 and 36: Wang discloses that early termination takes place if spatially or/and temporally neighboring macroblocks have a specific relationship with the motion

information of the current macroblock after examining a specific mode (para. 96 of Wang – *if*

spatial and temporal motion vectors are determined to be too small, the macroblock is skipped).

    Regarding claim 37: Wang discloses a video encoding method for selecting the

encoding mode of a macroblock of an inter-coded frame (para. 9, lines 1-4 and para. 11 of

Wang), the method comprising: selecting a subset of macroblock modes for encoding (para. 58,

line 1 to para. 59, line 4 of Wang); comparing said subset of macroblock modes for coding

efficiency (para. 60, line 1 to para. 61, line 10 of Wang – *Motion information is used for a single*

macroblock to determine if frame or field encoding is to be performed. The other possible blocks

sizes are then decided upon based on the determination of frame or field mode.); and selecting a

mode having favorable coding efficiency, responsive to said step of comparing modes (para. 62,

line 1 to para. 63, line 5 of Wang – *Macroblock size is determined based on the efficiency of*

using a particular macroblock size responsive to the determination of whether to use field or

frame encoding.).

Claim Rejections - 35 USC § 103

10.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

11.   **Claims 5, 17 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over**

Wang (US-2003/0099292) in view of Horowitz (US-2003/0161402).

Regarding claims 5, 17 and 29: Wang does not disclose expressly checking the cost of a subset of macroblock modes, further checking only intra-coded modes if the checked cost meets a preset criteria, and selecting the mode for the current macroblock in response to the checked modes.

Horowitz discloses checking the cost of a subset of macroblocks, further checking only intra-coded modes if the checked cost meets a preset criteria, and selecting the mode for the current macroblock in response to the checked modes (para. 17 of Horowitz – *Each macroblock is checked to see if the motion estimate exceeds a wake value. If so, intra-coding is performed on the corresponding macroblock. If not, the corresponding macroblock is skipped.*).

Wang and Horowitz are analogous art because they are from the same field of endeavor, namely video encoding using macroblocks and mode selection. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to check the cost of a subset of macroblocks, further checking only intra-coded modes if the checked cost meets a preset criteria, and selecting the mode for the current macroblock in response to the checked modes, as taught by Horowitz. Since Wang, as discussed above in the rejection of claim 1, uses different macroblock sizes and modes, then by combination a subset of macroblock modes would be checked. The motivation for doing so would have been to more efficiently process the intra-coded frames of the video by skipping the macroblocks which do not have sufficient motion, and are therefore redundant. Therefore, it would have been obvious to combine Horowitz with Wang to obtain the invention as specified in claims 5, 17 and 29.

12.   Claims 6, 11, 18, 23, 30 and 35 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Wang (US-2003/0099292) in view of Kim (US-2002/0196854).

Regarding claims 6, 18 and 30: Wang does not disclose expressly adjusting an early-

stopping threshold in response to checked macroblock modes, and selecting the mode for the

current macroblock in response to the checked macroblock modes if the adjusted early-stopping

threshold is met.

Kim discloses adjusting an early-stopping threshold in response to checked macroblock

modes (para. 29, lines 1-8 of Kim – *computed encoder parameters determine range of search for*

high-level motion estimation, and thus correspond to the threshold), and selecting the mode for

the current macroblock in response to the checked macroblock modes if the adjusted early-

stopping threshold is met (para. 29, lines 5-12 of Kim – *mode selected if encoder parameters*

satisfied).

Wang and Kim are analogous art because they are from the same field of endeavor,

namely video encoding using macroblocks and mode selection. At the time of the invention, it

would have been obvious to a person of ordinary skill in the art to use threshold parameters to

determine how to efficiently compute modes, as taught by Kim. The motivation for doing so

would have been to improve encoding performance and reduce encoding/decoding computations

times. Therefore, it would have been obvious to combine Kim with Wang to obtain the

invention as specified in claims 6, 18 and 30.

Regarding claims 11, 23 and 35: Wang does not disclose expressly that the early stop

criteria are based on adaptive thresholding to stop checking other inter or intra modes.

Kim discloses that the early stop criteria are based on adaptive thresholding to stop

checking other inter or intra modes (para. 29 of Kim – *encoder parameters are produced based*

on an analysis of macroblocks in the down-sampled domain, and are thus adaptive; encoder

parameters used to determine mode if macroblock is within the search range).

Wang and Kim are analogous art because they are from the same field of endeavor,

namely video encoding using macroblocks and mode selection. At the time of the invention, it

would have been obvious to a person of ordinary skill in the art to base the early stop criteria on

adaptive thresholding to stop checking other inter or intra modes, as taught by Kim. The

motivation for doing so would have been to improve encoding performance and reduce

encoding/decoding computations times. Therefore, it would have been obvious to combine Kim

with Wang to obtain the invention as specified in claims 11, 23 and 35.

Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to James A. Thompson whose telephone number is (571)272-7441.

The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Edward L. Coles can be reached on 571-272-7402. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

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applications is available through Private PAIR only. For more information about the PAIR

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like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James A Thompson/
Primary Examiner, Art Unit 2625

13 August 2010